

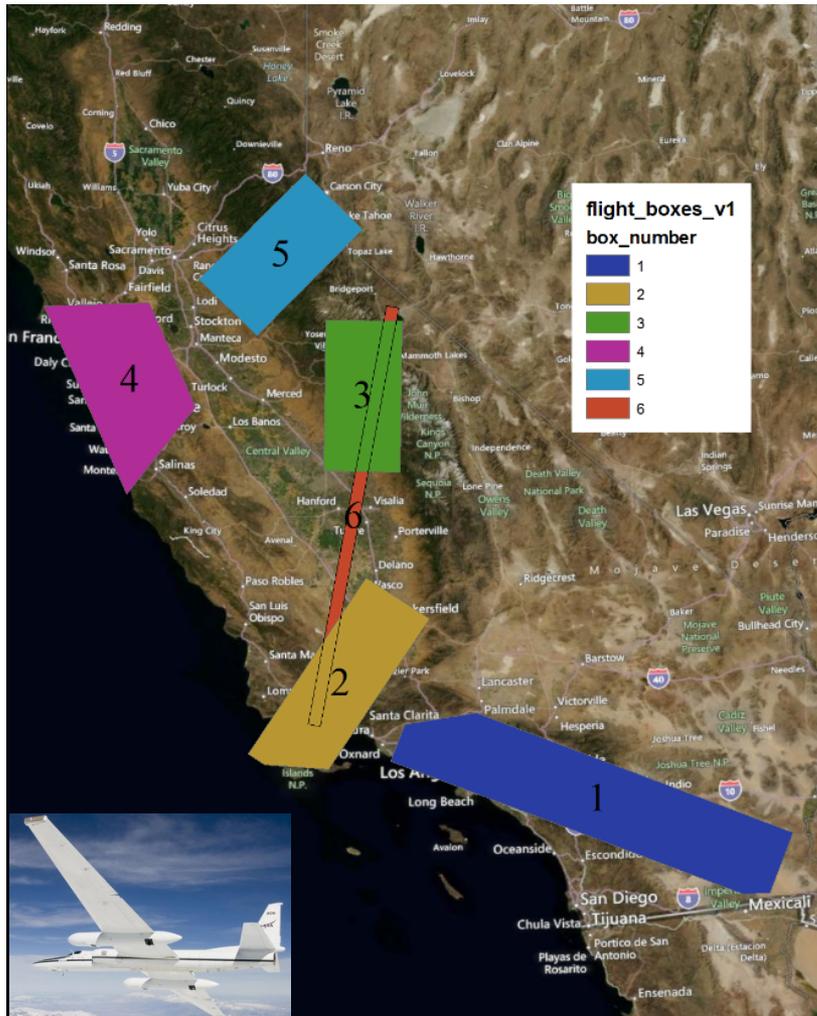


HyspIRI Aircraft campaign: science goals, project overviews & data sharing

[Rob Green & Simon Hook]



HyspIRI Preparatory Airborne Science (Ecosystems, Seasonal, Climate, Coastal, Urban, Resources)



- 6 zones, 3 seasons, 2 years
- Objective: Advance HyspIRI Mission Science Readiness
 - Ecosystem composition, function, biochemistry, seasonality, structure, and modeling
 - Coastal ocean phytoplankton functional types, habitat
 - Urban land cover, temperature, transpiration
 - Surface energy balance
 - Atmospheric characterization and local methane sources
 - Surface geology, resources, soils, hazards



AVIRIS and MASTER on ER-2





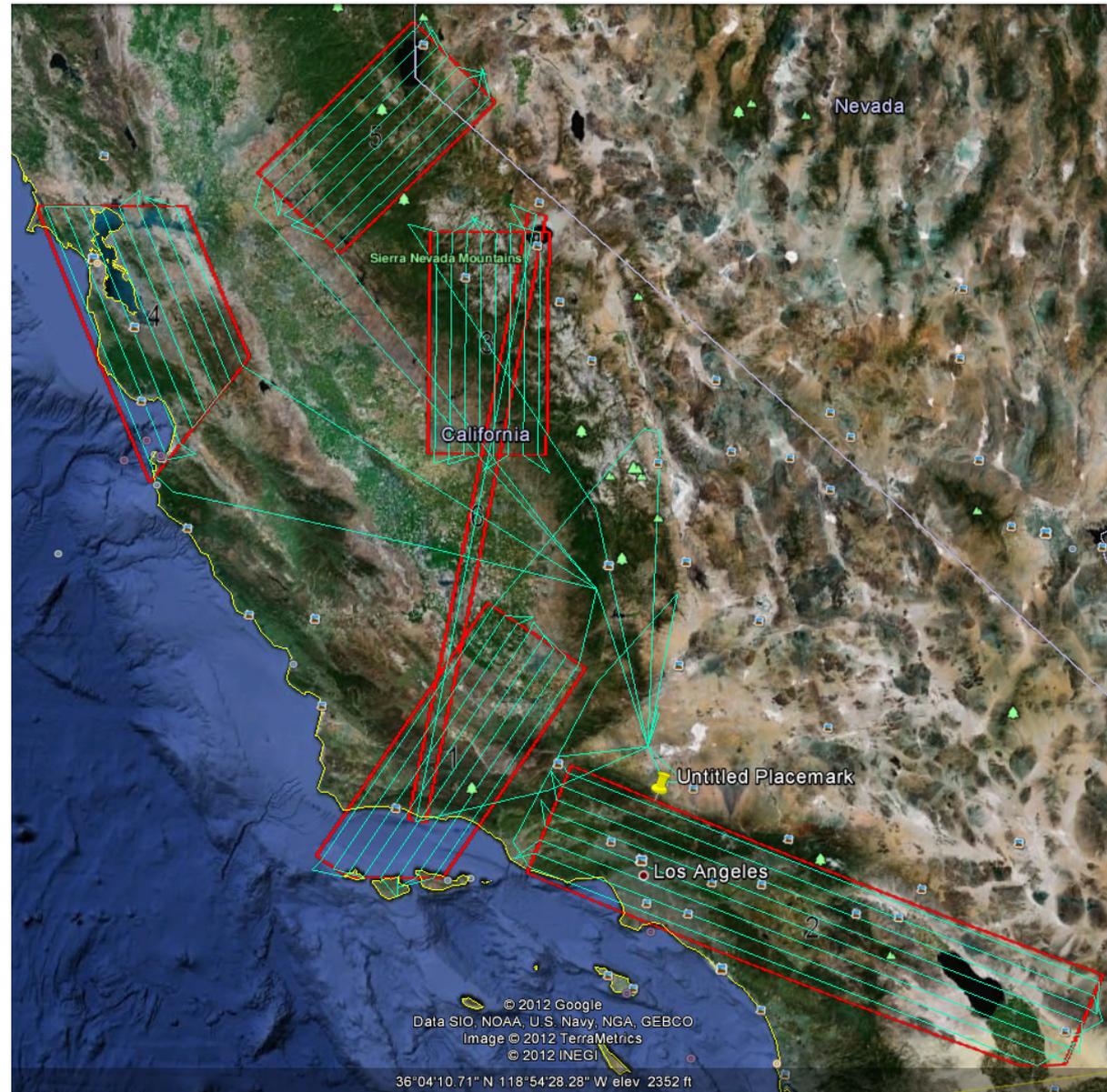
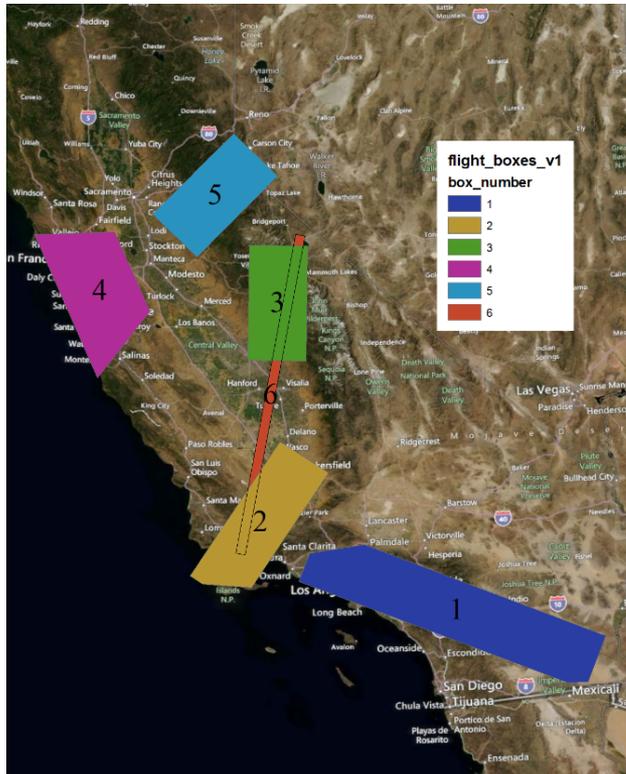
HyspIRI Preparatory Airborne Activities Projects



- Harvard/Paul Moorcroft - Linking Terrestrial Biosphere Models with Imaging Spectrometry Measurements of Ecosystem Composition, Structure, and Function
- UC Santa Barbara/Dar Roberts - HyspIRI discrimination of plant species and functional types along a strong environmental-temperature gradient
- UWI/Philip Townsend - Measurement of ecosystem metabolism across climatic and vegetation gradients in California for the 2013-2014 NASA AVIRIS/MASTER airborne campaign
- UC Davis/Susan Ustin - Identification of Plant Functional Types By Characterization of Canopy Chemistry Using an Automated Advanced Canopy Radiative Transfer Model
- Sonoma State/Matthew Clark - Spectral and temporal discrimination of vegetation cover across California with simulated HyspIRI imagery
- NRL/Bo-Cai Gao - Characterization and Atmospheric Corrections to the AVIRIS-Classic and AVIRISng Data to Support the HyspIRI Preparatory Airborne Activities
- USGS/Bernard Hubbard - Using simulated HyspIRI data for soil mineral mapping, relative dating and flood hazard assessment of alluvial fans in the Salton Sea basin, Southern California
- UC Riverside/George Jenerette - Assessing Relationships Between Urban Land Cover, Surface Temperature, and Transpiration Along a Coastal to Desert Climate Gradient
- NEON/Thomas Kampe - Synergistic high-resolution airborne measurements of ecosystem structure and process at NEON sites in California
- UC Santa Cruz/Raphael Kudela - Using HyspIRI at the Land/Sea Interface to Identify Phytoplankton Functional Types
- Bubbleology/Ira Leifer - Hyperspectral imaging spectroscopic investigation of California natural and anthropogenic fossil methane emissions in the short-wave and thermal infrared
- UMD/Shunlin Liang - Characterizing surface energy budget of different surface types under varying climatic conditions from AVIRIS and MASTER data
- RIT/Jan van Aardt - Investigating the impact of spatially-explicit sub-pixel structural variation on the assessment of vegetation structure from HyspIRI data
- UNV/Wendy Calvin - Energy and Mineral Resources: Surface composition mapping that identifies resources and the changes and impacts associated with their development



HyspIRI Preparatory Airborne Science (Ecosystems, Seasonal, Climate, Coastal, Urban, Resources)



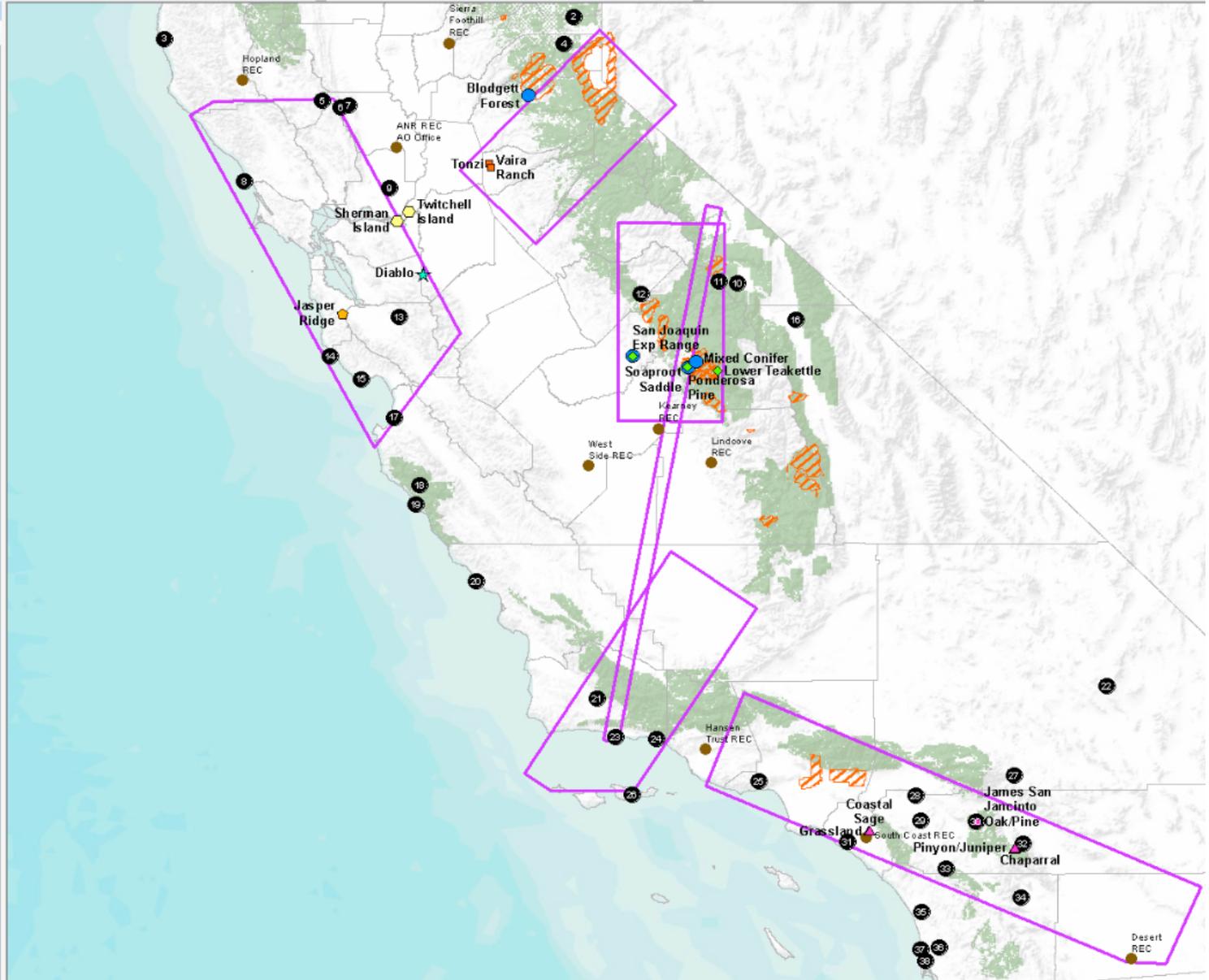


Infrastructure location



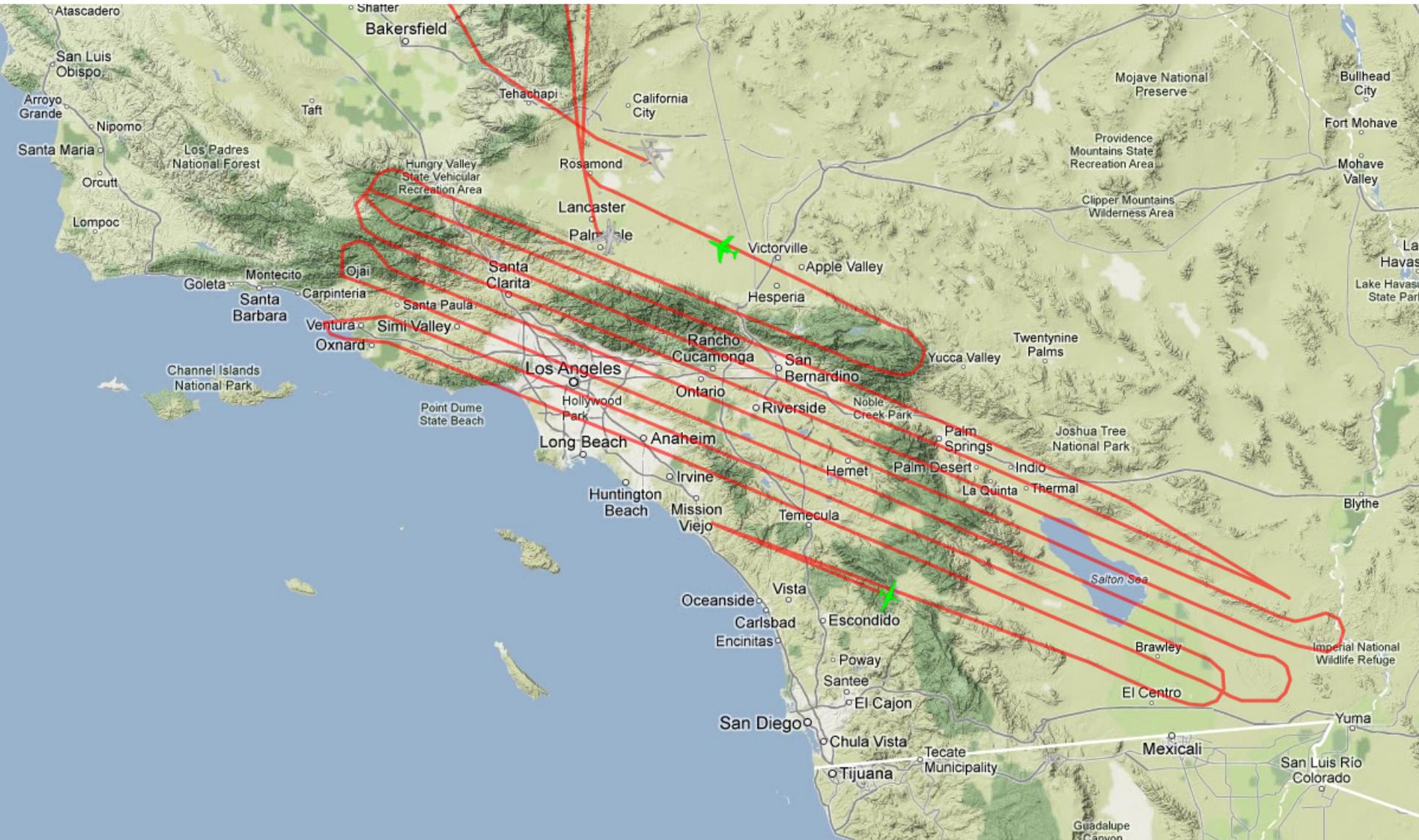
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 - HypIRI Flightline boundary
 - LiDAR acquisition boundaries 10_7
 - Background
- Layers
- Layers
- Layers
- Layers



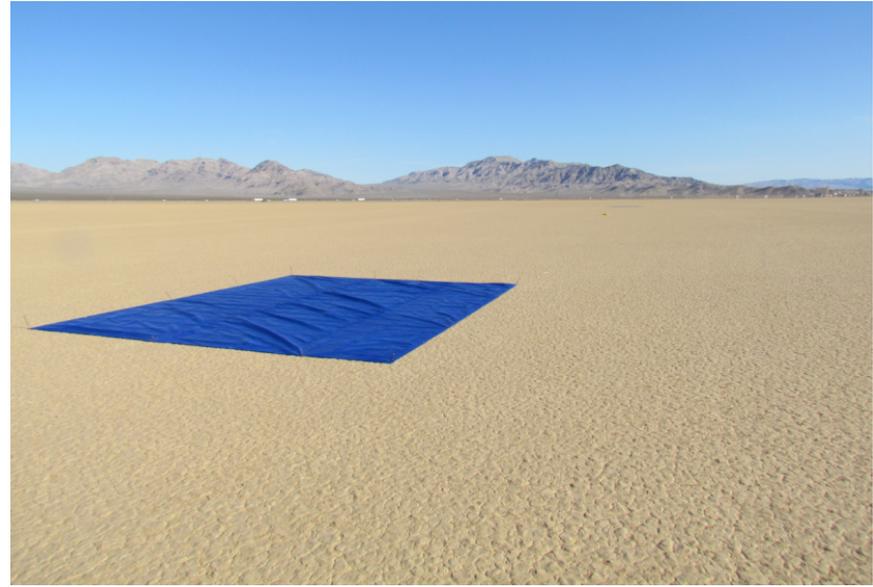


HyspIRI Preparatory Science Flight 22 May 2013





Example AVIRIS Calibration Validation Experiment Ivanpah Playa Calibration Site 2012

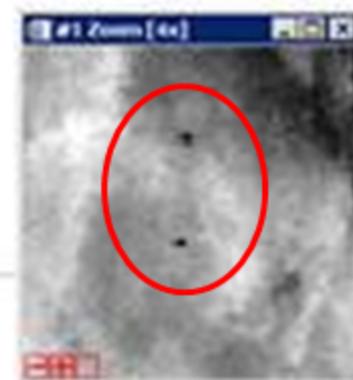
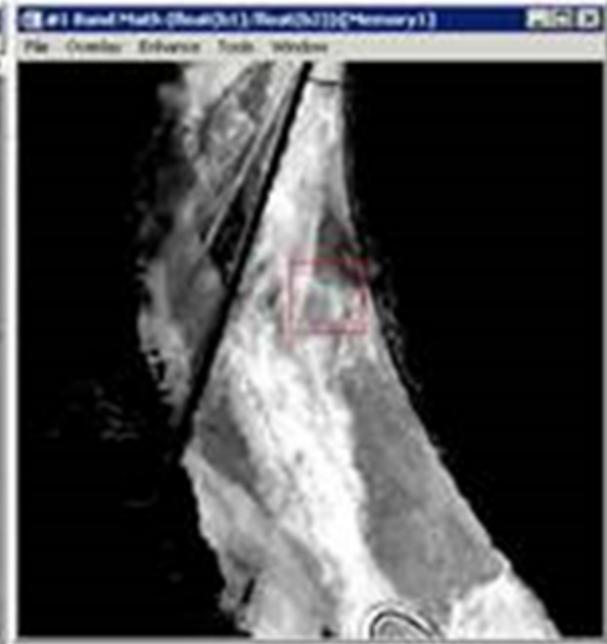




AVIRIS-C Calibration Experiment 3 May 2013

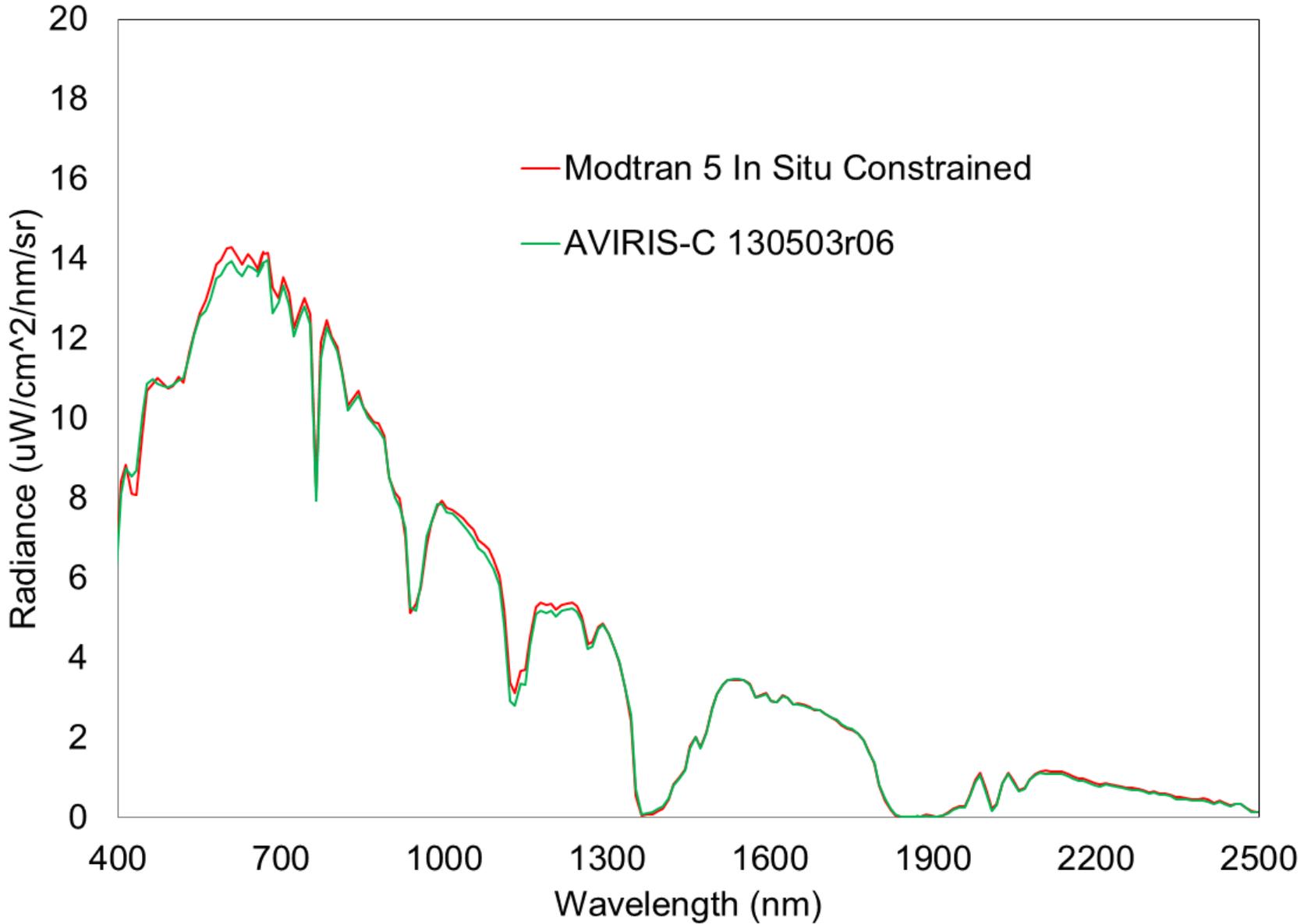


Ivanpah Tarp Location 130503



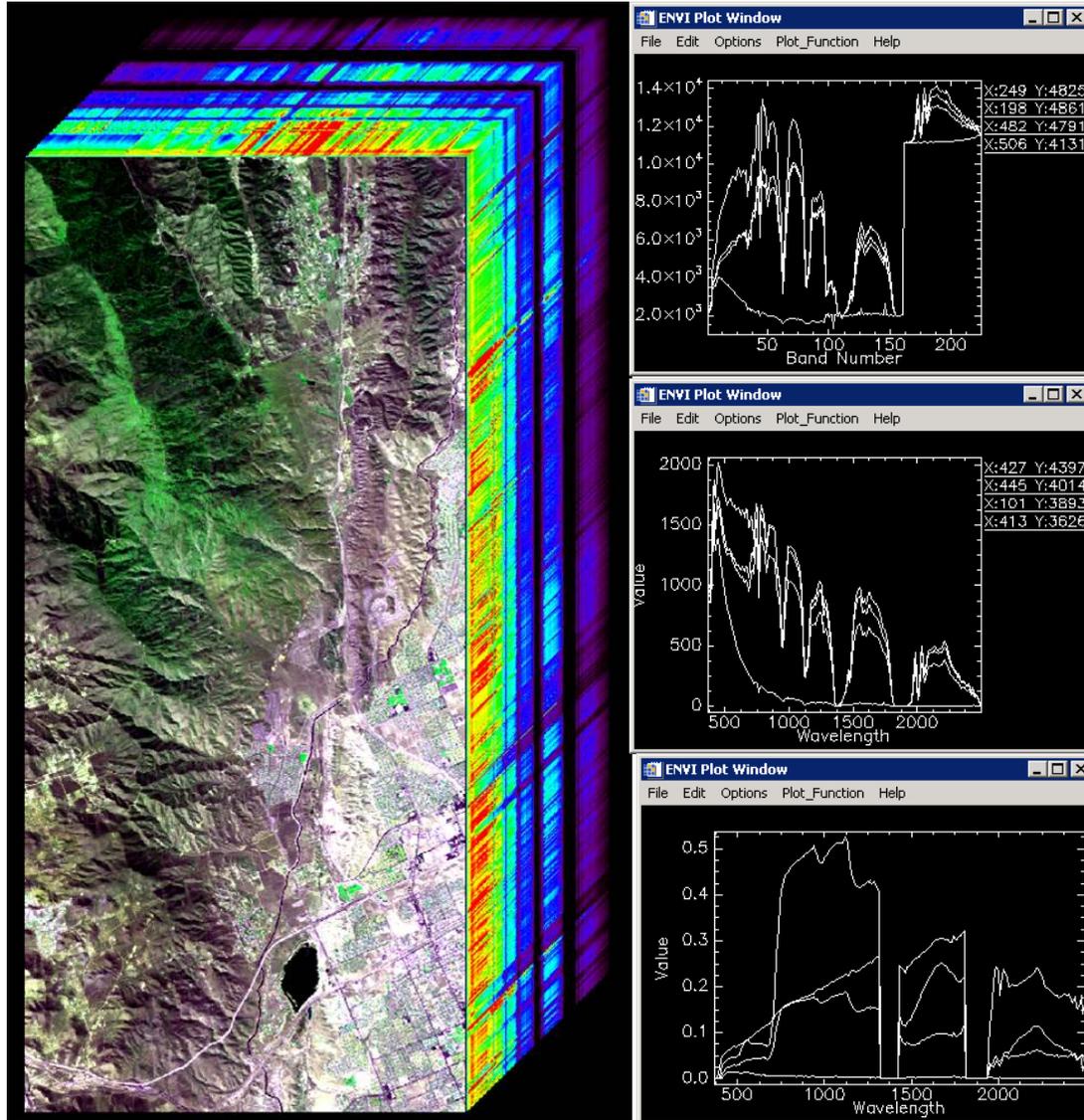


Preliminary Results 3 May 2013 HypsIRI Preparatory Campaign





HyspIRI Airborne Campaign – First Flights March 29, 2013, Palmdale CA



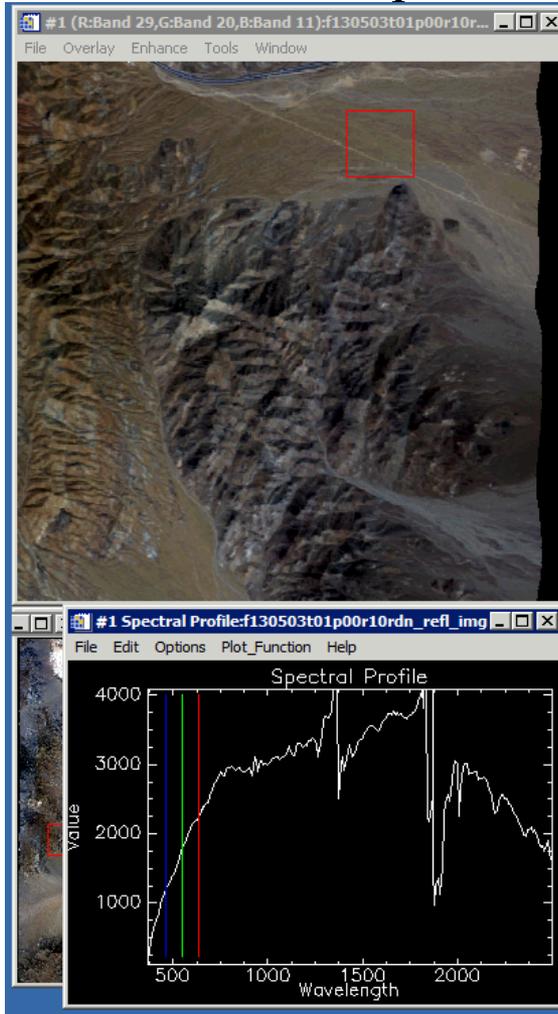
AVIRIS image cube and Level 1a, 1b and 2 spectra. The reflectance spectra (L2) will be used to address the full range of science objectives including ecosystems and climate.



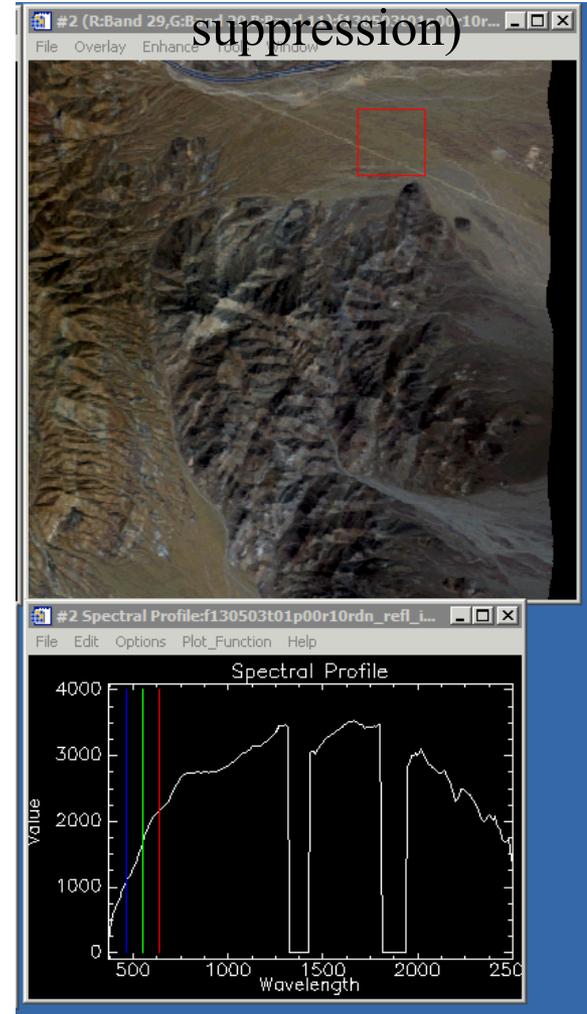
F130503t01p00r10 (typical spectrum)



ATREM output



Final L2 product (after residual suppression)

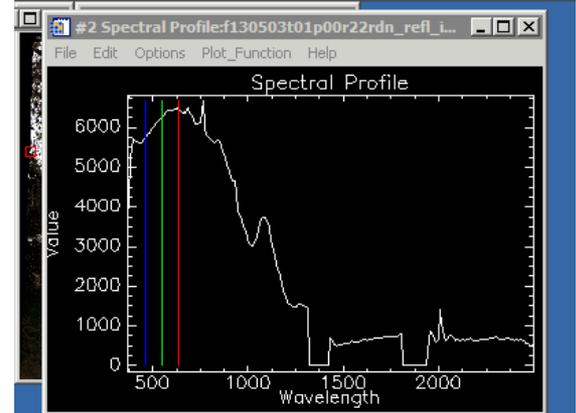
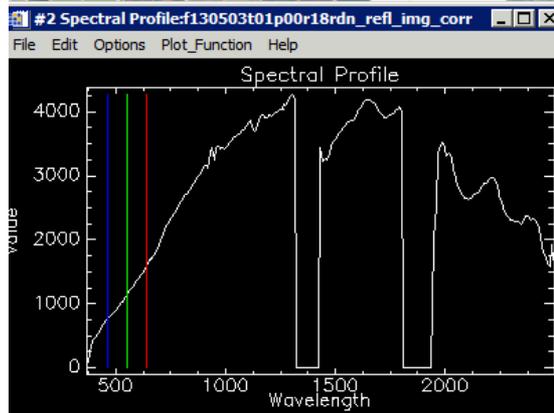
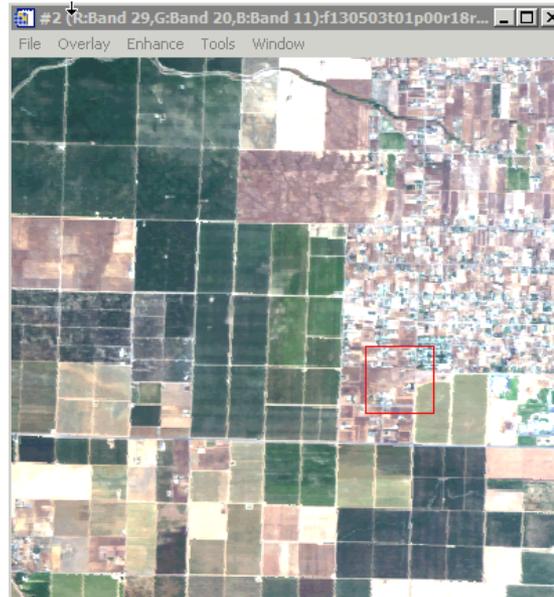
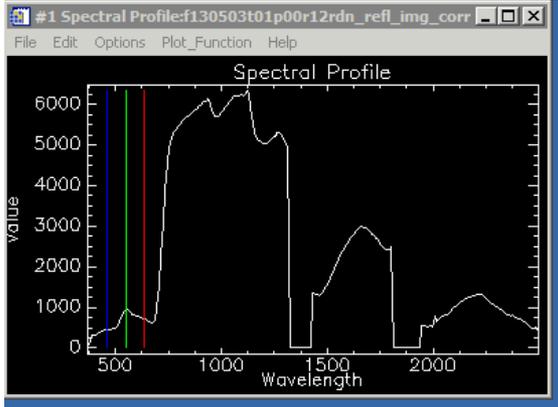




Vegetation (f130503t01p00r12)



Final L2 product (after residual suppression)





AVIRIS Locator/Download Tool L1b Radiance



- http://aviris.jpl.nasa.gov/alt_locator

AVIRIS DATA LOCATOR v2

SEARCH DATA
Attribute Filter

Conditional Filters: Thresholds Text Search

Year: 2006 AND Year: 2013
Month: 1 AND Month: 12
Day: 1 AND Day: 31
Run: 1 AND Run: 40
PixelSize: 0.50 AND PixelSize: 19.40
Rotation: -90 AND Rotation: 90
Solar_Elev: 0 AND Solar_Elev: 90
Solar_Azimuth: 0 AND Solar_Azimuth: 360

Pixel size unit is meters. Rotation, Solar Elevation, and Solar Azimuth are degrees.

Spatial Filter
Enter WGS-84 Latitude and Longitude in Decimal Degrees Format, e.g. Latitude=34.86 and Longitude=-125.94 (West negative).
- Then click **Images** or **Map** button under **View Results** below.

NONE
 RECTANGLE: (Select on Google Earth)
Upper Left Latitude= Longitude=
Lower Right Latitude= Longitude=

VIEW RESULTS
Image Display: 10% | **Images** | Small | **Map**

HELP

OTHER:

AVIRIS Data Unpacking Utilities:

- [AVIRIS Data Product Download Readme File](#)
- [Download GZIP executable for Windows | GZIP Man Page](#)
- [Download 7-Zip for Windows to unpack tar files](#)
- [Download TarTool to unpack tar files](#)

Fusion Table: https://www.google.com/fusiontables/DataSource?docid=1e4MrepsPJ21Hjrl_dFYSNgE3wTARnB5Zrgdm40

NAME: f130503t01p00r13
5/3/2013 UTC 19:23
Flight Log: f130503t01
site_name: Yosemite-NEON
Box 1 (YN35)
nasa_log: 132003
investigator: Robert Green
comments: LN2 refill at 1930
NS: 1210.00 **NL:** 11763.00
PixelSize: 13.90(m)
Solar Elevation: 67.37
Solar Azimuth: 161.27
Rotation: 0.00

Results Count=30
Notes on Map Display:
- Toggling Data Layers (buttons in right corner of map): Click on these to show *All* AVIRIS data or the *Attrib. Filtered* data (that which meets the attribute criteria, ignores spatial filter).
- Bounding Box (red rectangle): Click on the red rectangle to activate. Can resize it (drag corner) or move (drag edges). To update spatial filter, click the 'Update Map' button below the map.
- Downloading Data: Click on data coverages to activate info window with corresponding metadata and link for downloading TAR file. If unable to click on coverages, zoom in on map and retry.
- SQL query submitted to the Fusion Table is shown below the file list

File List:
f130503t01p00r06_sc01
f130503t01p00r07_sc01
f130503t01p00r08_sc01
f130503t01p00r09_sc01
f130503t01p00r10_sc01
f130503t01p00r11_sc01



Contents of an AVIRIS tar file

Filename	Type
..	Up-Dir
AVIRIS_OrthoProcessing_Info.txt	Text Doc...
f091006t01p00r15.info	INFO Unk...
f091006t01p00r15rdn_b_eph	Unknown
f091006t01p00r15rdn_b_gain	Unknown
f091006t01p00r15rdn_b_longlat_eph	Unknown
f091006t01p00r15rdn_b_nav	Unknown 5,2
f091006t01p00r15rdn_b_obs	Unknown 106,
f091006t01p00r15rdn_b_obs.hdr	HDR Unk...
f091006t01p00r15rdn_b_obs_ort	Unknown 149,
f091006t01p00r15rdn_b_obs_ort.hdr	HDR Unk...
f091006t01p00r15rdn_b_ortho.readme	README ...
f091006t01p00r15rdn_b_ort_glt	Unknown 14,9
f091006t01p00r15rdn_b_ort_glt.hdr	HDR Unk...
f091006t01p00r15rdn_b_ort_igm	Unknown 63,8
f091006t01p00r15rdn_b_ort_igm.hdr	HDR Unk...
f091006t01p00r15rdn_b_ort_img	Unknown 1,67
f091006t01p00r15rdn_b_ort_img.hdr	HDR Unk...
f091006t01p00r15rdn_b_rcc	Unknown
f091006t01p00r15rdn_b_spc	Unknown

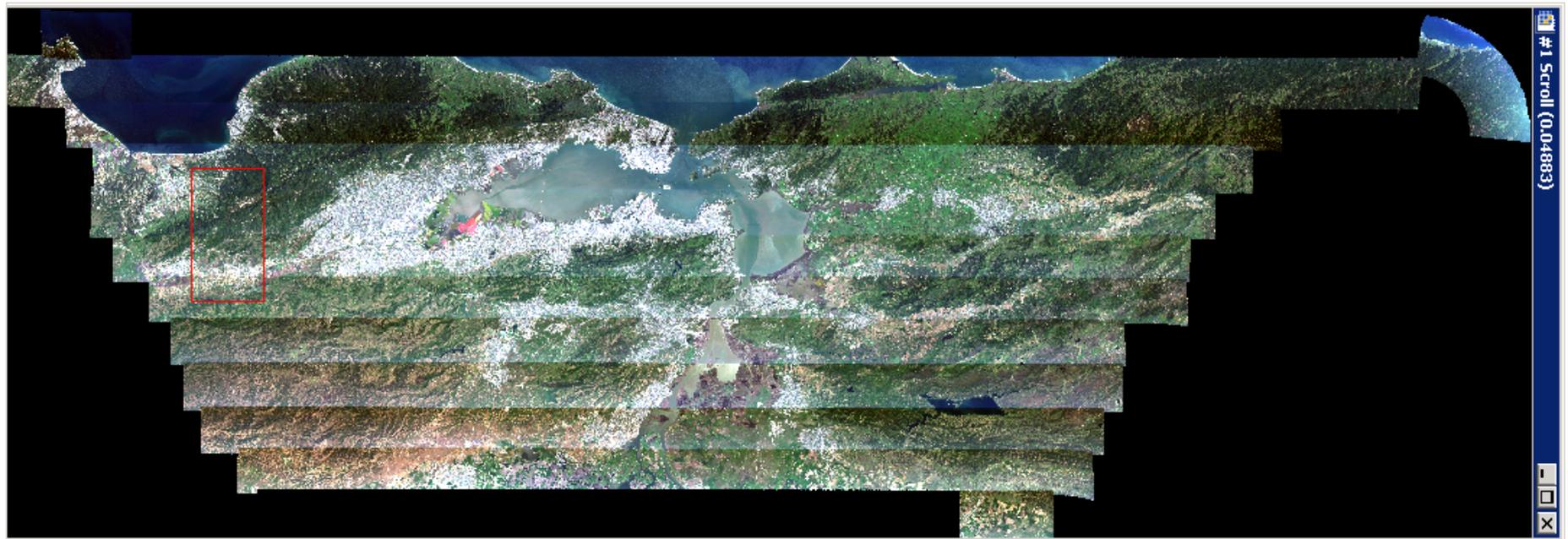


Readme File

```
f091006t01p00r15rdn_b_ortho.readme - WordPad
Home View
Clipboard Font Paragraph Insert Editing
Courier New 11
B I U abc x² x³
Picture Paint drawing Date and time Insert object Find Replace Select all
1 2 3 4 5 6 7
The following types of files should be found:
PER FLIGHT LINE (i.e., occurs once per tar file/directory):
*info          general information about the flight line,
*gain          multiplication factors, radiance to 16-bit integer,
*nav           navigation data,
*rcc           radiometric calibration coefficients,
*readme       this file,
*txt          description of AVIRIS orthorectification processing,
*spc          spectral calibration file.
*rcc           radiometric calibration coefficients,
*glt          geometric look up table file
*glt.hdr      geometric look up table file header
*igm          input geometry file
*igm.hdr      input geometry file header
*eph          the position data in a WGS-84/NAD83 UTM x,y,z coordinate
              system
*lonlat_eph   the position in WGS-84 longitude, latitude and elevation
*obs          raw spatial format of the observation and illumination
              conditions of the uncorrected AVIRIS data,
*obs.hdr      associated header
*obs_ort      rendered image using the *_ort_glt lookup table and matches
              the orthorectified imagery,
*obs_ort.hdr  associated header
*img          orthorectified, scaled radiance image
*img.hdr      orthorectified, scaled radiance image file header
To list files (table-of-contents):
tar tvf "tar file name,"
To extract files:
tar xvf "tar file name" "extract file name,"
To get information about tar:
man tar
-----
```

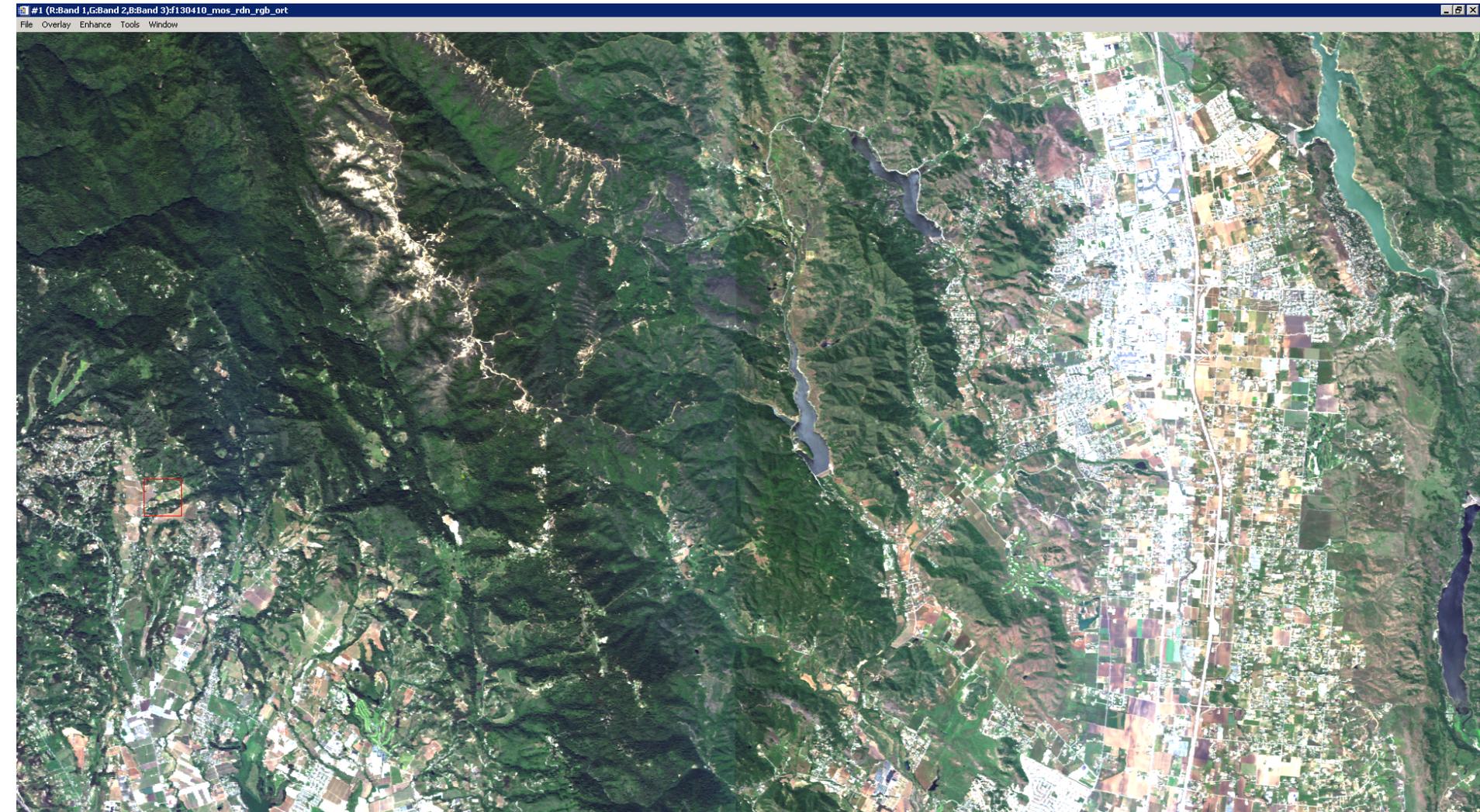


Mosaic Tool





Portion of a Mosaic





AVIRIS-C Summary



- Successful collection the first season of the HypsIRI preparatory airborne campaign
- A calibration/validation experiment was held on the 3rd of May
- Level 1b data are being loaded into the AVIRIS locator/download tool
- Test Level 2 data will be added to the tool starting next week
- We replaced the on-board calibrator bulb on AVIRIS yesterday
 - It should last for 2-3 years
- Summer season AVIRIS measurements for the HypsIRI preparatory airborne campaign have begun.